

17.12 1)

ΔΕΔΟΜΕΝΑ	ΖΗΤΟΥΜΕΝΑ
$y(t) = x^2(t) - 3x(t) - 6$	α) $y(t_0) = ;$
$x(t_0) = 5$	β) $y'(t_0) = ;$
$x'(t_0) = -1$	

α) $y(t) = x^2(t) - 3x(t) - 6 \xrightarrow{\text{θέτουμε } t=t_0} y(t_0) = x^2(t_0) - 3x(t_0) - 6 \Rightarrow$
 $\xrightarrow{x(t_0)=5} \Rightarrow y(t_0) = 5^2 - 3 \cdot 5 - 6 \Rightarrow \boxed{y(t_0) = 4}$

β) $y(t) = x^2(t) - 3x(t) - 6 \xrightarrow{\text{παραγωγίζουμε}} y'(t) = 2x(t)x'(t) - 3x'(t) \Rightarrow$
 $\xrightarrow{t=t_0} \Rightarrow y'(t_0) = 2x(t_0)x'(t_0) - 3x'(t_0) \xrightarrow{x(t_0)=5, x'(t_0)=-1} \Rightarrow y'(t_0) = 2 \cdot 5 \cdot (-1) - 3 \cdot (-1) \Rightarrow$
 $\Rightarrow \boxed{y'(t_0) = -7}$

17.12 2)

ΔΕΔΟΜΕΝΑ	ΖΗΤΟΥΜΕΝΑ
$y(t) = 2x^2(t) - 5$	α) $y(t_0) = ;$
$x(t_0) = 2$	β) $y'(t_0) = ;$
$x'(t_0) = 3$	

α) Έχουμε
 $y(t) = 2x^2(t) - 5 \xrightarrow{t=t_0} y(t_0) = 2x^2(t_0) - 5 \xrightarrow{x(t_0)=2} y(t_0) = 2 \cdot 2^2 - 5 \Rightarrow \boxed{y(t_0) = 3}$

β) Έχουμε
 $y(t) = 2x^2(t) - 5 \xrightarrow{\text{παραγωγίζουμε}} y'(t) = 4x(t)x'(t) \xrightarrow{t=t_0} y'(t_0) = 4x(t_0)x'(t_0) \Rightarrow$
 $\xrightarrow{x(t_0)=2, x'(t_0)=3} \Rightarrow y'(t_0) = 4 \cdot 2 \cdot 3 \Rightarrow \boxed{y'(t_0) = 24}$

17.12 3)

ΔΕΔΟΜΕΝΑ	ΖΗΤΟΥΜΕΝΑ
$y(t) = x^2(t) + x(t) - 1$	α) $y(t_0) = ;$
$x(t_0) = 3$	β) $y'(t_0) = ;$
$x'(t_0) = 2$	

α) $y(t) = x^2(t) + x(t) - 1 \xrightarrow{\text{θέτουμε } t=t_0} y(t_0) = x^2(t_0) + x(t_0) - 1 \Rightarrow$
 $\xrightarrow{x(t_0)=3} \Rightarrow y(t_0) = 3^2 + 3 - 1 \Rightarrow \boxed{y(t_0) = 11}$

β) $y(t) = x^2(t) + x(t) - 1 \xrightarrow{\text{παραγωγίζουμε}} y'(t) = 2x(t)x'(t) + x'(t) \Rightarrow$

$$\begin{array}{ccc} \overset{t=t_0}{} & \overset{x(t_0)=3, x'(t_0)=2}{} & \\ \Rightarrow y'(t_0) = 2x(t_0)x'(t_0) + x'(t_0) & \Rightarrow & y'(t_0) = 2 \cdot 3 \cdot 2 + 2 \Rightarrow \boxed{y'(t_0) = 14} \end{array}$$

17.12 4)

ΔΕΔΟΜΕΝΑ	ΖΗΤΟΥΜΕΝΑ
$y(t) = x^3(t)$	α) $y(t_0) = ?$
$x(t_0) = 3$	β) $y'(t_0) = ?$
$x'(t_0) = -4$	

$$\alpha) \quad y(t) = x^3(t) \xRightarrow{\text{θέτουμε } t=t_0} y(t_0) = x^3(t_0) \xRightarrow{x(t_0)=3} y(t_0) = 3^3 \Rightarrow \boxed{y(t_0) = 27}$$

$$\beta) \quad y(t) = x^3(t) \xRightarrow{\text{παραγωγίζουμε}} y'(t) = 3x^2(t)x'(t) \xRightarrow{t=t_0} y'(t_0) = 3x^2(t_0)x'(t_0) \Rightarrow$$

$$\xRightarrow{x(t_0)=3, x'(t_0)=-4} y'(t_0) = 3 \cdot 3^2 \cdot (-4) \Rightarrow \boxed{y'(t_0) = -108}$$